2

Museums and bird habitats in Victoria

2.1 The Committee visited various sites in and around Melbourne on 3 May 2012. The Committee inspected Melbourne Museum's natural history collections, research facilities, and exhibition spaces. The Committee also received briefings from BirdLife Australia and inspected shorebird habitats around Western Port.

2.2 The site inspections in Victoria provided the Committee with an opportunity to consider the significance of migratory bird populations, the threats to shorebird habitats, and the possible effects of climate change. The Committee also gathered evidence on the role of natural history museums in collecting, storing and communicating information on biodiversity, and heard about innovations in technology that will make it easier to engage the community in issues of biodiversity.

Committee activities

Melbourne Museum

2.3 The Melbourne Museum is home to Australia's second largest museum collection, with over 15 million objects dating back to 1857. It has more visitors and research staff than any other Australian museum.[1]

2.4 The Committee inspected Melbourne Museum's extensive natural history collection and research facilities, and received briefings from senior staff. The visit gave the Committee the opportunity to inspect the Museum's private collections of marine and terrestrial invertebrates, mammals, birds,

1 Museums Board of Victoria, *Annual report 2010–11*, Museum Victoria, 2011, p. 2; Discussions with museum staff during site inspections, 3 May 2012.

and bird eggs (oology), as well as the Museum's tissue bank. In the public area, the Committee was shown through the Science and Life Gallery, which highlighted the key role of both static and interactive exhibits in educating the community about Australia's unique biodiversity.

2.5 Throughout its visit, the Committee met with and received briefings from the following representatives from Melbourne Museum:

- Dr Robin Hirst, Director, Collections, Research and Exhibitions; and
- Dr Mark Norman, Head of Sciences.

2.6 The Committee also met with other Museum staff during the visit, including:

- Dr Jane Melville, Senior Curator, Terrestrial Vertebrates;
- Dr Timothy O'Hara, Deputy Head of Sciences—Marine;
- Ms Wendy Roberts, Reef Watch Co-ordinator; and
- Dr Joanna Sumner, Manager, Genetic Resources.

2.7 Issues of particular interest to the inquiry which were examined during the visit included the role of museums in providing essential research and monitoring services for biodiversity conservation, and the capacity of museums to engage with the public through citizen science programs, new technologies, and public exhibits.

Figure 2.1 Members inspecting a marine specimen collection at Melbourne Museum

Photograph courtesy of committee secretariat

BirdLife Australia

2.8 BirdLife Australia is a not-for-profit, non-government organisation dedicated to the conservation of native birds. It seeks to do this through the study and management of birds and their habitats, and through the education and engagement of members of the public.[2] BirdLife Australia was formed in 2012 through the merger of Birds Australia and Bird Observation and Conservation Australia, established in 1901 and 1905 respectively.

2.9 During its visit to Victoria, the Committee visited the offices of BirdLife Australia and received briefings on the existing threats to bird species and how these were likely to be affected by climate changes. Accompanied by representatives of BirdLife Australia, the Committee travelled to Hastings, on Western Port, where it inspected salt marsh communities affected by development pressures around Warringine Park. The Committee also visited Koo Wee Rup lookout, which provided an appropriate backdrop for further discussions on issues affecting the area's significant shorebird populations.

2.10 During its visit to BirdLife Australia offices and Western Port Bay, the Committee received briefings from:

- Dr Graeme Hamilton, Chief Executive Officer, BirdLife Australia;
- Dr Jenny Lau, Head of Conservation, BirdLife Australia;
- Dr Birgita Hansen, Research Fellow, University of Ballarat; and
- Mr Ken Gosbell, Member, Australasian Wader Studies Group.

2.11 During the briefings, the Committee received the following documents from BirdLife Australia representatives:

- *The State of Australia's Birds 2007: Birds in a Changing Climate*, Birds Australia, December 2007.
- *Australia's Important Bird Areas: Key Sites for Bird Conservation*, Birds Australia, October 2009.
- *Improving Our Understanding of Waterbirds in Western Port*, Central Coastal Board, Melbourne, August 2011.
- *Dramatic Declines of Australia's Migratory Shorebirds – Indicative Data*, BirdLife Australia, 2012.

2 Birds Australia, *Submission 40*, p. 1.

- 'Birds in the Red', *Decision Point*, 59, May 2012, pp. 8–9.
- *Stilt: The Journal for the East Asian–Australasian Flyway*, 60, October 2011.
- *Birds and Climate Change*, briefing notes, BirdLife Australia.
- Central Coast Board brochure titled: *Shorebirds in Western Port*.
- BirdLife Australia brochures titled: *Discover Birdlife*; *Your Support Makes a Huge Difference*; *Your Time Matters to Us*; and *Protecting Our Beach-nesting Birds*.

2.12 BirdLife Australia provided the Committee with an overview of the threats facing Australia's bird populations, in addition to observed and anticipated effects of the changing climate. The Committee was specifically informed about the threats facing shorebirds in the Western Port area, where sea level rises threatened to swamp much of the existing habitat used for feeding and roosting. The Committee also heard about the impact on migratory shorebirds of industrial developments taking place in feeding grounds overseas.

Issues explored in Victoria

2.13 The Committee's site inspection activities focused on the role of natural history museums in collecting and disseminating information on Australia's biodiversity, and the impacts of climate change on shorebirds and their habitats. Briefings with representatives of Melbourne Museum and BirdLife Australia highlighted the evolving role for new technologies in effectively engaging the public on issues relating to biodiversity and climate change. The role of collaboration and cooperation—both within Australia and internationally—was also raised during the course of the Committee's site inspections. These are discussed in further detail below.

Biodiversity research and monitoring: a role for museums

2.14 Natural history museums have an important role to play in biodiversity research and monitoring. During its inspection of the Melbourne Museum, the Committee heard about the invaluable resources that museum collections provide for important biological research. Museums also have an important role in species identification and distribution monitoring.

2.15 As noted earlier, the Melbourne Museum collection of over 15 million items includes examples of rare and extinct species, and specimens collected from populations that are now locally extinct. The Committee

heard that gene technology has enabled new types of research to be carried out on collection specimens. DNA technology, for example, has enabled comparisons between the genetic composition of locally extinct species with current populations, and has made it possible for the Museum to identify the source of previously unknown specimens. The Museum's tissue bank, in which animal tissues such as hearts, livers and feathers are frozen for future research, is also contributing to the Museum's research capacity. Similarly, field notebooks in the Museum's collection can be used by scientists to replicate past experiments, thereby allowing an assessment of changes in biodiversity over time.

2.16 Like many other public museums, the Melbourne Museum's collections are available for use by researchers from all over the world. The Committee was informed that most research at the Museum is undertaken by visiting researchers from other institutions, supplementing research carried out by directly employed staff. Current areas of research include: taxonomy, systematics, community ecology, phylogeny, and biogeography, in both marine and terrestrial biosciences; and conservation and resource management.[3] Members of the public are able to draw on the expertise of the researchers by sending in specimens or photographs to the Museum's Discovery Centre for identification.[4]

2.17 Melbourne Museum contributes to many collaborative research projects and programs.[5] For example, the Museum is a partner in the National Environmental Research Program's Marine Biodiversity Hub, a Commonwealth Government initiative that provides 'scientific information and advice to support decision making in the marine environment'.[6] The Museum's researchers also contributed to the global Census of Marine Life, a 10-year project completed in 2010 which involved 2700 scientists from more than 80 countries. The census aimed to assess the diversity, distribution and abundance of the world's marine species, and created a baseline against which to measure changes to marine

3 See Museum Victoria, 'Terrestrial environments', <http://museumvictoria.com.au/collections-research/our-research/sciences/terrestrial-environments/> viewed 23 May 2012; Museum Victoria, 'Marine sciences', <http://museumvictoria.com.au/collections-research/our-research/sciences/marine-biology/> viewed 23 May 2012.

4 Museum Victoria, 'Identifications', <http://museumvictoria.com.au/discoverycentre/ask-us-a-question/identifications/> viewed 23 May 2012.

5 Collaboration is formally carried out under the banner of Museum Victoria, which is the organisation responsible for operating Melbourne Museum and two other museums.

6 National Environmental Research Program, 'NERP Marine Biodiversity Hub', <http://www.nerpmarine.edu.au/> viewed 23 May 2012.

environments. The census also led to the discovery and formal description of more than 1200 new species.[7]

2.18 The Committee also heard that Museum experts provide advice to the Australian Quarantine and Inspection Service, and contributed to the proposed development of a national system for dealing with marine pests.

Committee comment

2.19 The Committee recognises and appreciates the important work that natural history museums do to provide governments, the scientific community, and the general public with a better understanding of biodiversity issues. The Melbourne Museum's collections and research facilities greatly exceed the relatively small amount that can be put on public display at any one time, a fact clearly demonstrated to the Committee throughout the site inspection.

2.20 During the course of the inquiry, participants have commented on the need for reliable baseline data to enable the effective monitoring of changes in biodiversity over time. Such data are necessary for an adaptive approach to be taken to biodiversity management. The Committee's visit to Melbourne Museum highlighted the important role of natural history museums in carrying out research to establish this baseline data and monitor changes over time.

2.21 Natural history museums need to be adequately funded in light of the important identification, research and monitoring work they carry out. The Committee heard about instances where funding for equipment had been secured, without funding for salaries to ensure the equipment could be operated. The Committee is also aware that museums may need to look increasingly to private and philanthropic sources of funding. A balance needs to be struck with respect to funding for natural history museums, taking into account competing demands on finite government resources, as well as acknowledging the public good delivered by such museums.

2.22 In the absence of a national natural history museum, state-based museums, including Melbourne Museum, have largely operated independently. The Committee acknowledges the role of the Council of Australasian Museum Directors, an association for leaders of national, state and regional museums in Australia and New Zealand, and Museums Australia, the national advocacy and professional body for the museum sector. The extent of cooperation and collaboration through these bodies

7 Census of Marine Life, 'About the census: a decade of discovery', <http://www.coml.org/about-census> viewed 23 May 2012.

is, however, limited. The Committee believes there is an increasing need for greater coordination between Australia's state-based museums in research and information-sharing, particularly in light of the national scale of threats to Australia's biodiversity associated with climate change. The Online Zoological Collections of Australian Museums (OZCAM, discussed below) and the Atlas of Living Australia (a central online repository of data about Australia's species) are welcome initiatives towards this end, and the Committee supports the development of further collaborative projects in the future. Increased coordination could reduce unnecessary duplication in research and increase the efficiency and effectiveness of museums' efforts.

New technologies for community engagement

2.23 At the Melbourne Museum, the Committee was briefed on several electronic tools being used to better engage the community in biodiversity issues and the work of the museum. The Committee observed camera and computer equipment that is being used to convert collection specimens into digital format, making them accessible in more ways than was previously possible, such as through the Museum's website.

2.24 The Field Guide to Victorian Fauna is an example of a smart phone and tablet application that has been developed by the Museum. It contains detailed descriptions and high quality images of over 700 animal species found in Victoria.[8] The Museum plans to add more species and update descriptions on an ongoing basis, and the Committee heard that there are also plans to expand the application to cover fauna from all across Australia.

2.25 The OZCAM is a collaborative project in which the digital records of nine Australian natural history museums are being made available online. This aggregation of museum records means that data is available to researchers and members of the public Australia-wide, beyond the geographic regions covered by individual museums. The OZCAM has also contributed data to the Atlas of Living Australia, and to significant international initiatives such as the Global Biodiversity Information Facility and the Ocean Biogeographic Information System.[9]

8 See Museum Victoria, 'Museum Victoria's field guide to Victorian fauna: now available on the app store', <http://museumvictoria.com.au/discoverycentre/mv-field-guide-app/> viewed 23 May 2012.

9 OZCAM, 'About OZCAM', <http://www.ozcam.org.au/ozcam-data/> viewed 23 May 2012.

2.26 The Committee was impressed by the range and quality of interactive exhibits at 'Wild', a current exhibition in the Science and Life Gallery of the Melbourne Museum's public area. The exhibition features more than 750 preserved animals from around the world,[10] a sample of the Museum's vast zoological collection. The Committee inspected moveable touch screen devices that present images and video of each species, supplemented by information on conservation and the impacts of climate change and human activity. The Committee also inspected an interactive 'touch table' display that illustrates the migration of red-necked stints from Victoria to their breeding grounds in Siberia, highlighting the importance of adequate food supplies and habitat along the migration path to ensure the birds successfully make the journey. The Committee heard that the Museum aims to get the general public, particularly young people, interested in and excited about species, and therefore to improve their appreciation and understanding of the importance of biodiversity.

Figure 2.2 Members inspecting interactive devices in Melbourne Museum's *Wild* exhibition

Photograph courtesy of committee secretariat

10 Museum Victoria, 'Wild: amazing animals in a changing world', <http://museumvictoria.com.au/melbournemuseum/discoverycentre/wild/> viewed 24 May 2012.

Committee comment

2.27 The Committee observed visiting school children and families actively engaging with Melbourne Museum's biodiversity-related exhibitions. The interactive nature of the exhibitions provided visitors with an immersive experience and the Committee was pleased to see the level of visitor engagement with various exhibits.

2.28 The Committee notes the exciting opportunities offered by information technologies to enhance connections to young people in particular, to stimulate their interest in biodiversity, to encourage an appreciation of the value of biodiversity, and to perhaps inspire careers in the natural sciences. New information technologies also have the potential to improve collaboration in the science community, both nationally and internationally, and open up the information held by museums to a whole new audience, including citizen scientists.

Citizen science

2.29 The Committee's meetings with representatives from both Melbourne Museum and BirdLife Australia highlighted the contributions of community volunteers in gathering data on biodiversity. Furthermore, the Committee was advised that the involvement of these 'citizen scientists' helps research and conservation organisations engage sections of the community in issues relating to biodiversity and climate change.

2.30 Under the Museum Victoria banner, Melbourne Museum coordinates and participates in several programs that draw on input from citizen scientists. For example, Reef Watch Victoria is a not-for-profit project run in partnership with the Museum that 'encourages divers and snorkelers to monitor marine life at their favourite dive sites'.[11] Volunteer divers are provided with reef monitoring kits to help monitor and report on seasonal changes in species, special natural events, pest species, and illegal activities. The project aims to develop local knowledge about marine habitats and species, enhance the extent to which the community values the marine environment, and contribute to better management and conservation policies. Survey data, once validated, are made available to others through the project's website.[12]

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11 Reef Watch Victoria, 'About Reef Watch', <http://www.reefwatchvic.asn.au/AboutUs.htm> viewed 24 May 2012.

12 Reef Watch Victoria, 'About Reef Watch', <http://www.reefwatchvic.asn.au/AboutUs.htm> viewed 24 May 2012.

2.31 The Committee was informed that Museum Victoria is also looking at establishing the Victorian node of the Range Extension Database and Mapping Project (REDMAP). The REDMAP, initiated in Tasmania, is a citizen science project in which members of the public, particularly fishermen, are invited to report observations of marine species that are found outside their known distribution area. Sightings are verified by experts, where possible, and the data enable observations about how biodiversity is changing over time, including the shifting of species' ranges. The information collected is mapped and displayed on the REDMAP website.[13] At a public hearing in Hobart in January, the Committee was informed that REDMAP is in the process of being expanded nationally, with the national launch expected in late 2012.[14]

2.32 BirdLife Australia depends on its network of thousands of amateur birdwatchers to monitor the abundance and distribution of bird species around Australia. Volunteer birdwatchers take part in regular bird surveys and contribute their data to the Atlas of Australian Birds—one of the few long-term Australian programs for monitoring biodiversity and one of BirdLife Australia's most important projects. As at May 2012, there were 13 381 registered contributors, known as Atlassers, of whom 3872 were classified as 'active'.[15]

2.33 BirdLife Australia informed the Committee about the *Action Plan for Australian Birds 2010*, which follows earlier action plans in 1990 and 2000. The 2010 plan 'analyses the status of all the species and subspecies of Australia's birds to determine their risk of extinction' and identified 238 threatened or extinct bird taxa.[16] The Committee heard that BirdLife Australia is using the data to identify the most vulnerable species and inform conservation programs, by monitoring current bird distributions, predicting vulnerabilities to climate change, and anticipating range changes.

13 REDMAP, 'What is Redmap?', <http://www.redmap.org.au/about/What-is-redmap/> viewed 24 May 2012.

14 Dr Gretta Pecl, Institute for Marine and Antarctic Studies, *Transcript of evidence*, 31 January 2012, pp. 18–19.

15 BirdLife Australia, 'Birdata—The Atlas of Australian Birds', <http://www.birdata.com.au/atlasstats.do> viewed 24 May 2012.

16 Birds Australia, 'New action plan for Australian birds', <http://www.birdsaustralia.com.au/homepage-news/new-action-plan-for-australian-birds.html> viewed 24 May 2012.

Committee comment

2.34 The Committee notes that citizen science is increasingly being recognised as a way of tapping into the local expertise of amateur scientists and the broader community. The Committee is pleased that citizen science initiatives are being embraced by some of the key organisations involved in biodiversity conservation. With appropriate quality controls in place, citizen science can contribute to a more detailed understanding of Australia's biological diversity, and related changes over time.

2.35 In addition to generating valuable data, citizen science delivers the benefit of increasing the community's awareness of biodiversity issues and engagement in conservation efforts. Citizen science initiatives have the capacity to form a vital link between the community, scientists, and decision-makers.

Climate change and other threats to Australian birds

2.36 BirdLife Australia advised the Committee that birds are good indicators of environmental health, due to their relative prominence in ecosystems. The Committee was provided with an overview of the major threats to Australian bird populations and their habitats, including: land clearing and habitat fragmentation; altered fire regimes; over-extraction of water from rivers; loss of wetlands; feral predation; grazing; and fishing practices. BirdLife Australia expects climate change to exacerbate these threats, as well as introduce new threats.[17]

2.37 Aside from interactions with these existing threats, the Committee heard that climate change itself is expected to have, and is already having, direct impacts on many bird species. The most notable effects to date have been changes to the distribution of bird species, changes which have been observed in the absence of any other known threatening processes. In response to shifting food sources due to temperature increases, many birds appear to have extended their ranges further south in general, and upslope in alpine areas. The Committee was advised that the cumulative loss of bird habitat over many decades, particularly in southeastern and southwestern Australia, has impaired the ability of birds to adapt to the direct effects of climate change.

17 BirdLife Australia, *Birds and climate change*, briefing notes.

2.38 At a public hearing in Melbourne on 4 May 2012, BirdLife Australia told the Committee that birds are particularly vulnerable to extreme heatwaves, which are predicted to increase in frequency and severity due to climate change.[18] The Committee was also informed that birds are particularly sensitive to changes in habitat and food availability resulting from climate change.[19]

2.39 The Committee was informed about the significance of migratory shorebirds, bird species that make annual round trip migrations between breeding grounds in the northern hemisphere and non-breeding areas in the south. Under various international agreements, Australia has an obligation to protect migratory birds and their habitats.[20] Western Port, southeast of Melbourne, is one of Victoria's most important sites for migratory shorebirds. It is recognised as a wetland of international significance under the Ramsar Convention,[21] and is regularly used by around 20 000 birds, including around 10 000 shorebirds and 10 000 waterfowl.[22]

2.40 During its visit, the Committee learned there are four major threats to the birds of Western Port:

- Disturbance, particularly to roosting sites, by humans, pets, and watercraft;
- habitat loss, particularly due to development and erosion;
- predation by feral animals, including cats, foxes, and black rats; and
- climate change.

2.41 With respect to climate change, sea level rises are expected to have a significant impact on intertidal foraging sites and high tide roosting sites in Western Port. Under a sea level rise of 0.8 metres, as projected for 2100 under some climate change scenarios, the Committee heard that more than 90 per cent of existing high tide roosting sites would be

18 Mr Charlie Sherwin, BirdLife Australia, *Transcript of evidence*, 4 May 2012, p. 14.

19 Mr Sherwin, BirdLife Australia, *Transcript of evidence*, 4 May 2012, p. 14.

20 Department of Sustainability, Environment, Water, Population and Communities, 'Migratory waterbirds', <http://www.environment.gov.au/biodiversity/migratory/waterbirds/index.html> viewed 19 October 2012.

21 Convention on Wetlands of International Importance especially as Waterfowl Habitat. Ramsar (Iran), 2 February 1971. UN Treaty Series No. 14583. As amended by the Paris Protocol, 3 December 1982, and Regina Amendments, 28 May 1987.

22 Central Coastal Board, *Improving our understanding of waterbirds in Western Port*, CCB, Melbourne, August 2011, p. 2.

inundated. While some adaptation may be possible under natural conditions, in many sites coastal development and artificial levee banks will prevent opportunities for the shoreline to shift in response to sea level rises. At Hastings, the Committee examined the succession of different vegetation types in the intertidal zone, from mangroves through to narrow strips of saltmarsh, grasslands, and tea trees, all set immediately against a road and housing development. It was apparent that with even a relatively modest sea level rise, shorebird foraging in the area would be severely restricted.

Figure 2.3 Photograph of remnant coastal wetland in Western Port illustrating the potential pressures on habitat from nearby development

Photograph courtesy of committee secretariat

2.42 BirdLife Australia has initiated several projects to help improve the resilience of bird populations to climate change. These include:

- *Shorebirds 2020*, which aims to raise community awareness of the importance of tidal ecosystems, improve information gathering and seek protection for critical shorebird areas threatened by human development;
- *Woodland Birds for Biodiversity*, which aims to 'improve on-ground management and protection of woodland habitat'; revegetate and restore habitat to improve its connectivity and magnitude; and monitor the impacts of climate change on woodland birds; and

- *Beach-nesting Birds*, which focuses on improving the management of nesting sites, encouraging change in the behaviour of beach users, and modelling the impacts of sea level rises on relevant habitats.[23]

Committee comment

2.43 The Committee notes the vulnerability of bird species in particular to the effects of climate change—both in isolation and when combined with the range of existing stressors on birds and their habitats.

2.44 The Committee recognises the complexities associated with efforts to conserve bird habitats, particularly where shorebird habitats face additional pressures due to coastal developments. Nevertheless, the Committee welcomes efforts to protect key bird habitats and to build the resilience of birds to climate change impacts. Indeed, the Committee is aware of recent research suggesting that revegetation efforts can improve bird-related biodiversity in woodland ecosystems.[24]

International cooperation on migratory birds

2.45 As noted above, Western Port is home to many migratory shorebirds, including the red-necked stint, the eastern curlew, the curlew sandpiper, the great knot, and the red knot. Many of these bird species breed in the Arctic during the northern summer then migrate up to 12 000 kilometres to spend the annual non-breeding season in southern Australia's inter-tidal wetlands. The Committee was informed that over 30 years' worth of data collected regularly by volunteers at sites around Western Port suggest a concerning trend, with nearly all migratory shorebird species declining in numbers. Species that have seen particularly dramatic declines include the eastern curlew, the curlew sandpiper and the red knot.

2.46 The major route taken by these birds during their migration from the Arctic to southern Australia is known as the East Asian–Australasian Flyway.[25] The Committee was advised that the absence of changes to

23 BirdLife Australia, *Birds and climate change*, briefing notes.

24 DB Lindenmayer, AR Northrop-Mackie, R Montague-Drake, M Crane, D Michael, S Okada and P Gibbons, 'Not all kinds of revegetation are created equal: revegetation type influences bird assemblages in threatened Australian woodland ecosystems', *PLoS ONE*, 7(4): e34527. doi:10.1371/journal.pone.0034527, 2012, <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0034527> viewed 8 September 2012.

25 Central Coastal Board, *Improving our understanding of waterbirds in Western Port*, CCB, Melbourne, August 2011.

Australian shorebird sites in recent years suggested that the species declines were attributable to changes outside Australia.[26]

2.47 The Committee was informed that the loss of habitat in East and South East Asia is suspected to be the primary cause of the declines in Australia's migratory shorebird numbers. Tidal mudflats around the Yellow Sea are key stop-over sites for many birds on the East Asian-Australasian Flyway, and access to adequate food sources in these areas is essential for birds to continue travelling the long distance to their Arctic breeding grounds. The Committee heard that between 50 and 60 per cent of the tidal zone around the Yellow Sea has been reclaimed, and BirdLife Australia provided several examples of recent large scale industrial developments on sites which were once important feeding grounds.

2.48 It was suggested that, although Australia has bilateral agreements in place with the governments of Japan, China and the Republic of Korea for the protection of migratory birds,[27] the agreements have not been entirely effective in preventing the destruction of key stop-over habitats.

Committee comment

2.49 Given that climate change is expected to provide an even more challenging set of circumstances for bird species, the Committee considers there would be benefits in mitigating other pressures on migratory birds wherever possible. The Committee therefore notes concerns about the adequacy of international agreements for the protection of migratory bird habitats and will consider this matter carefully in the context of its inquiry.

Concluding remarks

2.50 Having received evidence from other museums at public hearings held earlier in the inquiry process, the Committee was pleased to have the opportunity to visit a natural history museum in Melbourne. Highlights of the visit included seeing firsthand the scope of the Melbourne Museum's collections and research facilities, and hearing about how technological

26 Australasian Wader Studies Group, *Dramatic declines of Australia's migratory shorebirds – indicative data*, BirdLife Australia, 2012.

27 The agreements are respectively known as the Japan–Australia Migratory Bird Agreement (JAMBA), the China–Australia Migratory Bird Agreement (CAMBA) and the Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA).

advances are changing the way in which the museum conducts its research and engages with visitors and the general public.

2.51 Noting the importance of birds as key indicators of environmental health, the Committee appreciated the opportunity to inspect key shorebird habitat in Western Port. The site inspection highlighted the vulnerability of birds to existing threats and the anticipated effects of climate change.

2.52 The Committee wishes to record its thanks to Melbourne Museum and BirdLife Australia, whose representatives provided invaluable assistance and information throughout the Committee's site inspections in Victoria.